

Serial No. 09/841,380Docket No. 56433US002

Remarks

The Specification and claims 1, 33, 38 – 41, 50 – 52 and 54 – 57 have been amended. Antecedent basis for the amendments to claims 1 and 33 can be found in the Written Description at, e.g., page 4, lines 7 – 26 and page 10, lines 17 – 19. Claims 33 – 59 will be pending after entry of this amendment.

This amendment is accompanied by a Supplemental Information Disclosure Statement providing copies of references recently cited by the Examiner Fred J. Parker in copending U.S. Patent Application Serial No. 09/841381. The Examiner may want to review this copending application, whose disclosure is related to the present application.

Election/Restriction

The claims were restricted to the following groups:

- I. Claims 1 – 32, drawn to a method, classified in class 427, subclass 458.
- II. Claims 33 – 59, drawn to an apparatus, classified in class 118, subclass 629.

Applicants confirm their election of the claims of group II, and do so with traverse in view of this amendment. The Office Action asserted that “the apparatus can carry out another and materially different process such as transferring all rather than a portion of coating” and the “method can be carried out by another and materially different process such as... electrostatically applying the droplets to a non-liquid wetted conductive substrate”. Method claim 1 as amended recites “electrostatically spraying drops of the liquid onto a liquid-wetted target region of a conductive transfer surface”. Article claim 33 as amended recites “an electrostatic spray head that can apply drops of the coating composition onto the liquid-wetted target region of a conductive transfer surface”. These claims could be examined in a single application.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 38, 39, 44, 50, 51, 52 and 54 – 57 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as their invention. In particular, claim 38 was rejected on grounds that the term “suitable” is “a relative term which renders the claim indefinite”. Applicants have removed this term from claim 38.

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Claim 39 was rejected on grounds that it was "unclear whether applicant intends to claim a plurality of electrostatic spray head IN ADDITION to the first cited electrostatic spray of claim 33, or intended to claim that the electrostatic spray head of claim 33 is a plurality of electrostatic spray heads." Applicants have amended claim 39 to recite "a plurality of such electrostatic spray heads", and have made corresponding editorial amendments in claims 40 and 41.

Claim 44 was rejected on grounds that:

"The term "is improved" in claim 44 is a relative term which renders the claim indefinite. The term "is improved" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention."

Applicants have amended claim 44 to recite that the "uniformity of the coating on the substrate is improved compared to a coating made without such devices." Applicants' Written Description states at Page 8, line 25 that "Many criteria can be applied to measure coating uniformity improvement", and applicants list some of those criteria at page 8, line 26 through page 9, line 4. Applicants also illustrate visually detectable coating uniformity improvement in examples such as Example 3.

The rejections of claim 50 and claims 51, 52 and 54 – 57 can be handled as a group. Claim 50 was rejected on grounds that "The definition of the substrate in claim 50 does not further limit the apparatus of claim 46. Is the applicant claiming that the substrate is part apparatus?" Claims 51, 52 and 54 – 57 were rejected on grounds that "The method steps of claims 51, 52 and 54 – 57 do not further limit their parent claims. These limitations merely identify an intended use by defining the substrate. Is the applicant claiming that the substrate is part apparatus?" Applicants have amended claims 50 – 52 and 54 – 57 to recite that the claimed apparatus of these claims further comprises the recited substrate.

Claim 57 was also rejected on grounds that "The term "thereof" in claim 57 is a relative term which renders the claim indefinite." Applicants have amended claim 57 to remove this term and to recite that "the substrate comprises an electronic film, component or electronic component precursor." Those skilled in the art will readily understand the meaning of the term "electronic component precursor".

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Applicants accordingly request withdrawal of the rejection under 35 USC §112, second paragraph of claims 38, 39, 44, 50 – 52 and 54 – 57.

Rejection under 35 U.S.C. §102

Claims 33 – 35, 37, 38, 43, 51, 52, 54 and 56 – 59 were rejected under 35 U.S.C. §102(b) as being anticipated by Nakajima et al. (U.S. Patent No. 4,847,110). Applicants respectfully disagree. Nakajima et al.'s device uses an electrostatic gun to apply image forming elements to a rotating drum (see e.g., drum 20 in Fig. 6):

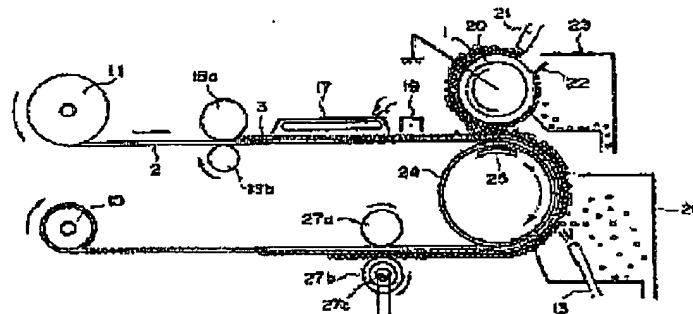
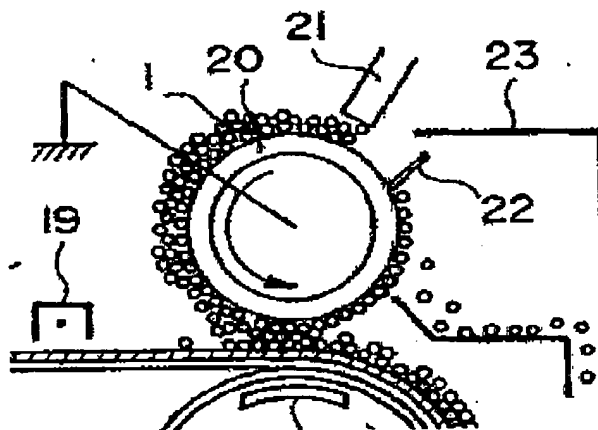


FIG. 6

The image forming elements are walled microcapsular particulates (see e.g., Fig. 1, col. 4, lines 12 – 15 and col. 7, lines 37 – 39) or solid or semisolid particulates (see e.g., col. 7, lines 39 – 45) having a range of particle sizes (see, e.g., col. 7, lines 54 – 60). These are not wet coating compositions and are never described as such (see especially col. 16, lines 5 – 9). Nakajima et al. also does not describe a wet conductive transfer surface. Thus even without regard to the present amendment Nakajima et al. does not anticipate the invention of claims 33 – 35, 37, 38, 43, 51, 52, 54 and 56 – 59. Moreover, taking into account the present amendment Nakajima et al. does not apply drops to a liquid-wetted target region of a conductive transfer surface. Note that Nakajima et al. applies solid or semisolid particulates, not liquid, to its transfer surface (stainless steel transfer cylinder 20). Also, cylinder 20 is scraped clean by blade 22 before cylinder 20 rotates past electrostatic gun 21 and thus the target region is bare:

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Moreover, with respect to claim 38, Nakajima et al.'s electrostatic spray gun does not produce "a line of charged droplets" and is not said to be capable of doing so. With respect to claim 55, Nakajima et al. does not disclose using a liquid for coating. With respect to claim 59, Nakajima et al.'s electrostatic spray gun does not produce "drops" and is not said to be capable of doing so.

Applicants accordingly request withdrawal of the rejection of claims 33 – 35, 37, 38, 43, 51, 52, 54 and 56 – 59 under 35 U.S.C. §102(b) over Nakajima et al.

Rejection of Claims 36, 42 and 53 under 35 U.S.C. §103

Claims 36, 42 and 53 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nakajima et al. as applied to claims 33 – 35 above and further in view of Booth, *Evolution of Coating*. Applicants respectfully disagree. As discussed above, Nakajima et al. does not show the device of claims 33 – 35, and as acknowledged in the Office Action, Nakajima et al. does not disclose using a belt as the transfer surface. The Booth article is relied to reject claim 36 on grounds that:

"Booth discloses using a belt [and] multiple transfer drums to transfer the coating liquid to the substrate (see page 37 to page 39, and Figures 40 and 41). Booth discloses that the steel belt is particularly well adapted to applying coatings to porous materials wherein a minimal "combining" pressure is needed (page 38, lines 7-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention with the desire to coat porous substrates to have

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added a belt for the transfer mechanism as suggested by Booth in the overall system of Nakajima in order to reduce damage to the substrate."

Booth does not say what minimal combining pressure is required in the described apparatus. However, Nakajima et al. does not strive to reduce combining pressure and instead actually requires it (see e.g., col. 11, lines 29 – 32). Moreover, Nakajima et al. does not mention any concerns regarding substrate damage and thus would have no reason to look to Booth. Any asserted combination of Nakajima et al. and Booth must also take into account Booth's closing comments regarding steel belt casting:

"Cast coating in the paper industry is now a mature process with small increases in demand. Coating has become so much more sophisticated and competitive that slow speed processes such [as] casting cannot compete for a larger market share.

"Likewise, steel belt casting has high capital cost and high maintenance. With new processes such as Ultraviolet (UV) curing, the need for the special properties of belt casting are being preempted."

Clearly, these statements teach away from the use of steel belt casting. A person of ordinary skill of the art would heed all of the statements in Booth and would not be motivated to combine Nakajima et al. and Booth to make the invention of claim 36.

The asserted basis for rejecting claims 42 and 53 is that:

"Booth discloses the use of multiple transfer surfaces (such as in Figures 30, 31, 32, 33 and 34, see pages 30-33) to meter the coating. Booth discloses that such multiple transfer surfaces are useful for maintaining coating weight control and uniformity (see page 30, lines 12-15). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to [use] a plurality of circulating transfer surfaces wherein the coating is transferred from a first surface to a second transfer surface as disclosed in Booth in order to maintain coating weight control and uniformity."

Booth and Nakajima would not be combined as suggested in the Office Action. As noted above, Nakajima involves the application of solid or semisolid image forming element particles to a target substrate, not the application of a wet coating composition. In the embodiment shown in Fig. 6, Nakajima et al. strive to transfer the elements from cylinder 20 to adhesive 3 on the target substrate. This transfer is not easy. Nakajima et al. rely on electrostatic charges, adhesive 3, pressure, heat and even magnets (see e.g., col. 11, lines

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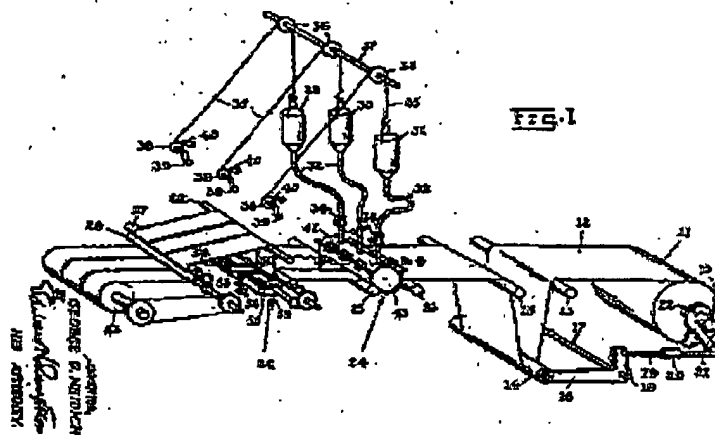
24 – 48 and col. 12. lines 35 – 39) to effectuate the transfer. Excess image forming elements that do not transfer to the substrate are scraped away with a blade (see the magnified view of a portion of Fig. 6, shown above). Nakajima et al. would have no motivation to add an additional transfer surface to its apparatus. Doing so would increase capital cost and decrease reliability, without providing any material advantage.

Applicants accordingly request withdrawal of the rejection of claims 36, 42 and 53 under 35 USC §103(a) as being unpatentable over Nakajima et al. in view of Booth.

Rejection of Claims 38 – 41 under 35 U.S.C. §103

Claims 38 – 41 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nakajima et al. as applied to claim 33 above and further in view of Neidich (U.S. Patent No. 2,833,666). Applicants respectfully disagree. As to claim 38, Nakajima et al. does not show the device of claim 33, and as acknowledged in the Office Action, Nakajima et al. does not disclose a series of spray heads ganged or grouped together to apply a coating to a transfer substrate. Applicants disagree with the assertion in the Office Action that Nakajima et al. discloses “the use of a single electrostatic spray had to produce a line of charge droplets”. Nakajima et al.’s device does not produce droplets.

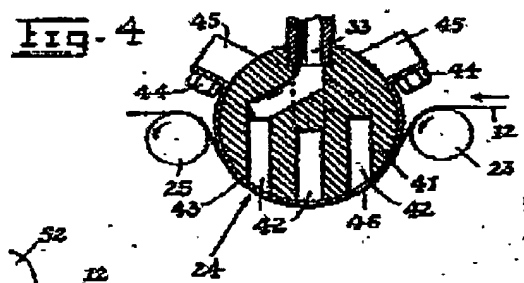
Neidich makes ink transfer ribbons, but does not employ a transfer surface to do so. Neidich’s apparatus is shown below:



The ink supply nozzle head 24 is shown in more detail in Fig. 4:

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Nozzle head 24 is a stationary slotted coating head for applying liquids. Neidich does not provide "multiple applicator nozzles to apply the coating liquid to the transfer surface, which thereupon applies the coating to the moving substrate". Moreover, Neidich does not involve electrostatic spray coating, and thus is not properly combinable with Nakajima et al. Also, Nakajima et al. involves application of solid or semisolid particles, whereas Neidich involves application of liquids, and this represents a further reason why Nakajima et al. and Neidich are not properly combinable. Even if the proposed combination of Nakajima et al. and Neidich was nonetheless made, such a combination would not provide an electrostatic spray head that produces a line of charged droplets as recited in applicants' claim 38.

The proposed combination of Nakajima et al. and Neidich also does not make obvious claims 39, 40 or 41. As noted above, Nakajima et al. does not involve the application of wet coating compositions. Moreover, Nakajima et al. does not describe or suggest a plurality of electrostatic spray heads. Neidich does not describe electrostatic spray heads or a conductive transfer surface, and would not properly be combinable with Nakajima et al. for the reasons already mentioned above. However, even if the proposed combination of Nakajima et al. and Neidich was made, it would not provide a plurality of electrostatic spray heads that apply one or more wet coating compositions to a conductive transfer surface as recited in applicants' claims 39, 40 and 41.

Applicants accordingly request withdrawal of the rejection of claims 38 – 41 under 35 U.S.C. §103(a) as being unpatentable over Nakajima et al. in view of Neidich.

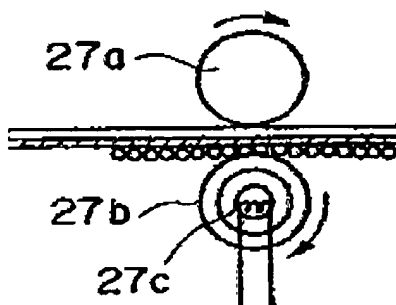
Rejection of Claims 44 – 50 under 35 U.S.C. §103

Claims 44 – 50 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nakajima et al. as applied to claims 33 – 35 above and further in view of Massey et al. (U.S. Patent No. 2,105,488). Applicants respectfully disagree. Claims 44 – 50 recite an

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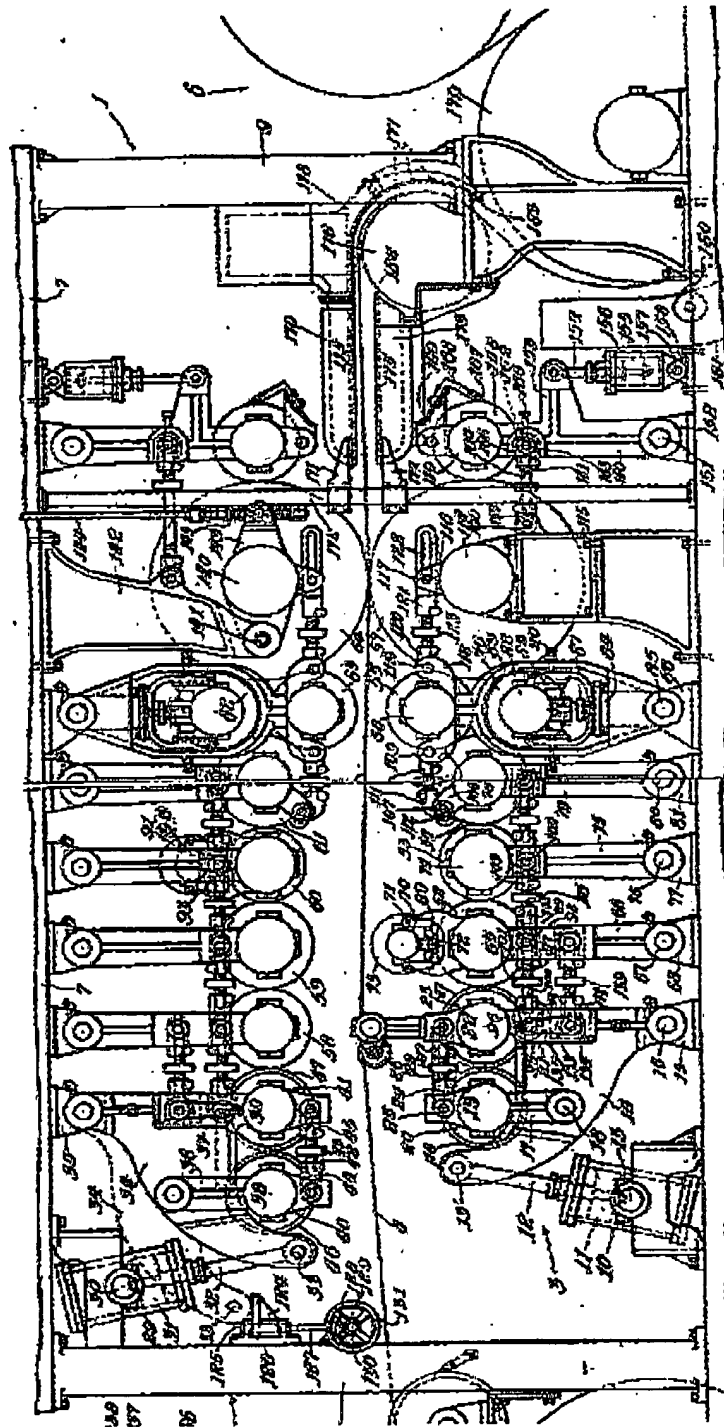
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apparatus "further comprising two or more pick-and-place devices that can periodically contact and re-contact the wet coating at different positions on the substrate". Nakajima et al. does not disclose wet coatings, and does not disclose any pick-and-place devices, let alone two or more of them. The cited items 27a, 27b and 27c in Nakajima et al. Fig. 6 are pressing and heating rollers that compress the solid or semisolid image forming elements into the layer of adhesive 3 (see col. 11, line 63 through col. 12, line 10):



These are dry rollers and a heater, not pick-and-place devices. As explained in applicants' Written Description, the pick-and-place devices have wet surfaces and pick up a portion of a liquid coating from one substrate position and place it down on a substrate at another position and at another time (see e.g., page 9, lines 25 – 31 and page 14, line 14 through page 15, line 4). This makes an already applied coating more uniform.

Massey does not disclose pick-and-place devices either. Massey describes a consolidated roll coater, also shown and discussed at page 30 and 31 of the Booth article (see Figure 29). Massey's coater is shown below, with most of Figs. 1 and 2 being spliced together for greater clarity. As shown, the target substrate (web 4) moves from right to left through coater 1. A liquid coating composition in the nip between fountain rolls 40 and 41 (see page 2, left hand column, lines 39 – 45) travels from roll 41 to the surfaces of distributing rolls 58, 59, 60, 61, 62 and 63, to applying roll 64 and then to the upper surface of web 4 (see page 2, right hand column, lines 47 – 63). A similar path involving fountain rolls 20 and 23, distributing rolls 52, 53, 54, 55, 56 and applying roll 57 places the coating on the lower surface of web 4. After the coatings are applied at rolls 64 and 57, the coated web passes over drying drums 5 (not shown below). The applied coating is not subjected to contact and re-contact by pick-and-place devices.



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Nakajima et al. and Massey are not properly combinable for reasons already indicated above. Nakajima et al. involves solid or semisolid image forming elements, whereas Massey involves liquid coatings. Nakajima et al. would not want to use Massey's distributing rolls, as such rolls would be poorly suited to handling Nakajima et al.'s image forming elements. Moreover, neither Nakajima et al. nor Massey employs any pick-and-place devices. Thus even if Nakajima et al. and Massey were combined, the result would not provide the invention recited in claims 44 – 50. Applicants accordingly request withdrawal of the rejection of claims 44 – 50 under 35 USC §103(a) over Nakajima et al. in view of Massey.

Conclusion

The cited Nakajima et al. reference does not anticipate the invention of claims 33 – 35, 37, 38, 43, 51, 52, 54 and 56 – 59. Among other things, Nakajima et al. does not employ wet coating compositions.

Nakajima et al. is not properly combinable with the other cited references to Booth, Neidich or Massey, and if so combined would not render claims 36, 38 – 42, 44 – 50 or 53 unpatentable. Although all these references involve coating techniques, coating is a diverse art. Nakajima et al.'s transfer of solid or semisolid image forming elements to a substrate is not comparable to and not combinable with Booth's, Neidich's or Massey's cited liquid coating devices. Moreover, if such combinations were nonetheless made, the resulting devices would not provide applicants' invention.

The remaining rejections have been rendered moot by this Amendment.

Applicants accordingly request reconsideration and withdrawal of the rejections and passage of this application to the issue branch. The Examiner is encouraged to telephone the undersigned attorney at 612-331-7412 to discuss any remaining questions concerning this application.

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**Marked Copy of November 2002 Amendment to the Specification
in USSN 09/841,380 (56433US002):**

At page 10, lines 20 – 29:

The presence of low caliper regions can be further discouraged and the cross-web uniformity of the coating on the transfer surface and target substrate can be further improved by changing the drop pattern position with respect to the rotating transfer surface during spraying using, for example, mechanical motion or vibration of the electrostatic spray head or heads as in U.S. Patent Nos. 2,733,171, 2,893,894 and 5,049,404; a change in the distance between the electrostatic spray head or heads and the substrate; or alteration of the electrostatic field as described in copending U.S. Patent Application Serial No. [_____] (Attorney Docket No. 56434USA9A.002) 09/841,381, filed [on even date herewith)] April 24, 2001 entitled VARIABLE ELECTROSTATIC SPRAY COATING APPARATUS AND METHOD, incorporated herein by reference.

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Marked copy of November 26, 2002 amendments to the claims
in USSN 09/841,380 (56433US002)

1. (Amended) A method for forming a liquid coating on a substrate comprising electrostatically spraying drops of the liquid onto a liquid-wetted target region of a conductive transfer surface, and transferring a portion of the thus-applied liquid from the transfer surface to the substrate to form a wet coating.

33. (Amended) An apparatus comprising a conductive transfer surface that when wet with a liquid coating composition can transfer a portion of the coating to a substrate, and an electrostatic spray head [for applying] that can apply drops of the coating composition [to the] onto a liquid-wetted target region of the conductive transfer surface.

38. (Amended) An apparatus according to claim 33 wherein the electrostatic spray head, or a [series] plurality of electrostatic spray heads ganged together in [a suitable] an array, produces a line of charged droplets.

39. (Amended) An apparatus according to claim 33 [wherein] comprising a plurality of such electrostatic spray heads [apply] that applies one or more coating compositions to the conductive transfer surface in one or more lanes.

40. (Amended) An apparatus according to claim 39 wherein the plurality of spray heads [apply] applies a plurality of coating compositions to one lane.

41. (Amended) An apparatus according to claim 39 wherein the plurality of spray heads [apply] applies coating compositions to a plurality of lanes.

44. (Amended) An apparatus according to claim 33 further comprising two or more pick-and-place devices that can periodically contact and re-contact the wet coating at different positions on the substrate, wherein the periods of the devices are selected so that the uniformity of the coating on the substrate is improved compared to a coating made without such devices.

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50. (Amended) An apparatus according to claim 46 further comprising the substrate, wherein the substrate comprises a rotating endless belt or moving web, and the rolls rotate with the belt or web.

51. (Amended) An apparatus according to claim 33 further comprising the substrate, wherein the substrate comprises an insulative substrate.

52. (Amended) An apparatus according to claim 51 further comprising the substrate, wherein the substrate comprises plastic.

54. (Amended) An apparatus according to claim 33 further comprising the substrate, wherein the substrate comprises a porous substrate.

55. (Amended) An apparatus according to claim 54 further comprising the substrate, wherein the substrate is coated without substantial penetration of the coating through the substrate.

56. (Amended) An apparatus according to claim 33 further comprising the substrate, wherein the substrate comprises a woven or nonwoven web.

57. (Amended) An apparatus according to claim 33 further comprising the substrate, wherein the substrate comprises an electronic film, component or electronic component precursor [thereof].